

Division of Duties: Crafting Ammunition

As firearms became more common in the second half of the sixteenth century, the job of producing musket balls and match cord fell to the wives and daughters of samurai.

Lead musket balls were cast from molds using lead ingots melted over small braziers. Each matchlock musket required shot of a specific size. This could be anywhere from about four millimeters in diameter, for small pistols, to more than 80 millimeters for heavy, cannon-like *ōzutsu*.

Early match cords were braided together from cypress or bamboo fibers. The natural oils in these fibers kept them burning slowly, but the cords took a long time to dry if they got wet. Eventually, wood-fiber cords gave way to cords woven from cotton and soaked in a solution of lye and saltpeter.

Like the match cord solution, gunpowder itself can be mixed using different ratios of saltpeter, wood ash, and sulfur. Certain ratios produced better or worse results, and braiding techniques and mixing ratios were therefore considered valuable military secrets.

Matsumoto Castle and Guns

Matsumoto Castle was built for the age of musket and cannon warfare. Its wooden walls were coated in thick, protective layers of plaster, and the Great Keep has 55 musket loopholes through which gunners could fire down on attackers. The layout of the castle grounds was calculated to ensure gunners in the keep could reliably hit targets attempting to cross the inner moat, 60 meters away.

Matsumoto Castle's loopholes are square. Their openings are wider on the interior than the exterior, a design that allows for a broad shooting arc while minimizing the gunner's exposure to enemy fire. Firing from the castle, a skilled sharpshooter using a specially made long-barreled matchlock could hit a target up to 300 meters away.